INSTRUMENT
LAB
AERONUTRONIC-FORD MOTOR CO.

PRICE $5.00

POWER SUPPLY

PROPERTY OF
AEF
METROLOGY
LABORATORY
RECEIVED:

INSTRUCTION MANUAL

kepco inc.®

131-38 SANFORD AVENUE • FLUSHING 52, N. Y.
Area Code 212 IN 1-7000 • TWX # NY 4-5196

MODEL SC-32-10

SERIAL NO. .....

KEPCO, INC.
131 - 38 Sanford Avenue
Flushing 55, New York

Copyright 1958
Kepco, Inc.
Flushing, New York

KEPCO, INC.
131 - 38 Sanford Avenue
Flushing 55, New York

SEMI-CONDUCTOR
VOLTAGE REGULATED POWER SUPPLY
MODEL SC-32-10

SPECIFICATIONS:

OUTPUT VOLTAGE DC: 0-32 volts continuously variable.

OUTPUT CURRENT DC: 0-10 amperes continuous duty.

REGULATION: In the range 0-32 volts, the output voltage variation is less than 0.01% or 0.002 volt, whichever is greater, for load variation from 0 to 10 amperes, and less than 0.01% or 0.002 volt, whichever is greater, for line fluctuation from 105-125 volts.

RIPPLE VOLTAGE: Less than 1 millivolt RMS.

FUSE PROTECTION: Input fuse on front panel.

The negative reference supply and amplifier is separately fused. This fuse is located on the reference power supply chassis directly behind the front panel. This fuse has been designed into this unit to protect the reference amplifier in the event of any internal failure.

STABILITY: The output voltage variation for a period of eight hours is less than 0.01% or 0.002 volt (whichever is greater).

OUTPUT IMPEDANCE: Less than 0.001 ohm from DC to 1 KC. Less than 0.01 ohm from 1 KC to 100 KC.

SHORT CIRCUIT PROTECTION: When the load exceeds the maximum

output current by 20%, the transistor amplifier automatically increases the impedance of the series pass transistors so that their wattage dissipation rating is never exceeded. A control which is available at the rear of the unit can be adjusted so that the over-current can be set from 0 to 120% of full load.

POWER REQUIREMENTS: 105-125 volts, 50-65 cycles.

OUTPUT TERMINATIONS: DC terminals are clearly marked on the front panel. All terminals are isolated from the chassis. Either positive or negative terminal of the DC output may be grounded. A terminal is provided for connecting to the chassis. The DC terminals are also brought out to a barrier terminal board at the rear of the unit. Two terminals on this terminal board are provided for remotely sensing the error signal directly at the load. This connection compensates for the voltage drop in the wires connecting the power supply to the load.

METERS: Voltmeter: 0-50 volts, 2-1/2".

Ammeter: 0-10 amperes, 2-1/2".

CONTROLS: Power on-off switch; ten turn voltage control.

PHYSICAL SPECIFICATIONS: Height 8-3/4", width 19", depth 13", color Kepco standard gray hammertone. This unit is designed for relay rack mounting or bench use. Carrying handles are provided on the front panel.

OPERATING INSTRUCTIONS: The Kepco Model SC-32-10 Semi-Conductor Voltage Regulated Power Supply is shipped without any internal packing material and may be put into operation immediately.

The remote error sensing terminals are connected directly to the rear output terminals by means of jumper bars on the barrier terminal board. The power supply is, therefore, set up for best regulation at either the front or rear output terminations.

PROCEDURE FOR OPERATING THE POWER SUPPLY FOR NON-REMOTE ERROR SIGNAL:

Turn on the power switch. Adjust the DC voltage control to the desired output voltage. The load may either be connected to the front DC output terminals or the rear DC output terminals. If the load is connected to the rear output terminals, the voltage across the front panel output terminals is regulated for load except for the very small drop in wires connecting front to rear terminals.

PROCEDURE FOR OPERATING THE POWER SUPPLY FOR REMOTE ERROR SIGNAL:

With the power supply turned off, remove the jumper bars from the remote error terminals located on the rear terminal board. Use twisted pair wire for connecting the + and - output terminals from the rear of the chassis to the load. Use another set of twisted pair wires connecting the + and - remote error signal terminals to the load contacts. Connect a 1 MF (100 WV) capacitor across remote sensing points. (See Figure I.)

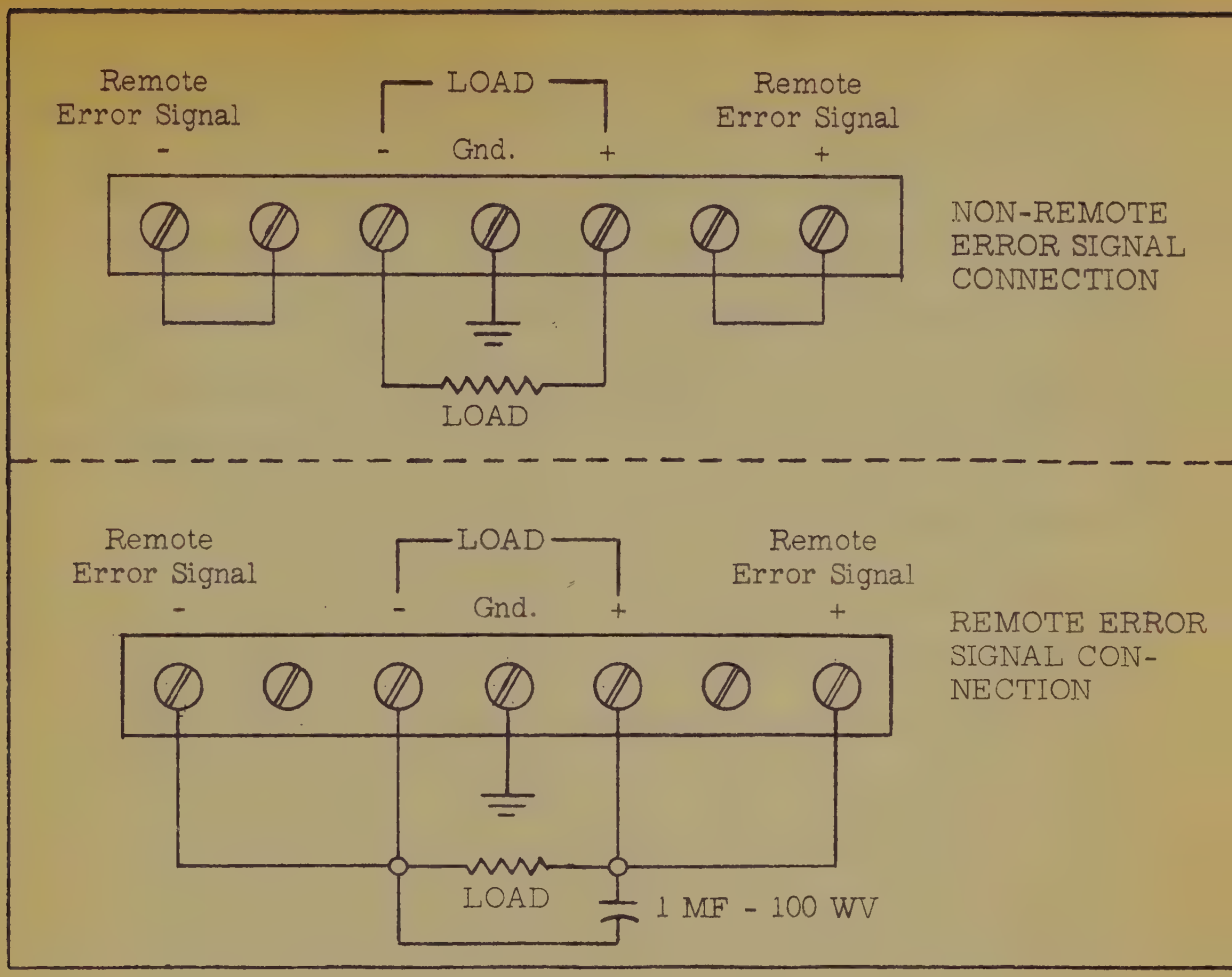


FIGURE I.

OVERLOAD PROTECTION DEVICE: This power supply is provided with overload protective circuitry which effectively limits the current in the series pass transistors to a value that is well within their dissipation ratings.

Two potentiometers are provided in order to properly set up this protective circuitry. These two controls are located on the rear deck of the power supply and are labelled on the rear cover "Over-Current Adjust" and "Over-Voltage Adjust". The adjustments of these potentiometers are

made at the factory and should not normally be disturbed. If, however, for any reason they must be adjusted, the procedure is as follows:

Remove the rear cover. The "Over-Current Adjust" control is located at the right end of the plug-in reference amplifier sub-assembly. The "Over-Voltage Adjust" control is located on the right end of the resistor board sub-assembly.

With the power supply turned off, turn the front panel voltage control to minimum position. Connect a 0 to 20 amperes DC ammeter across the output terminals. Connect a 0 to 50 volts DC voltmeter across the terminals labelled A+ and B- on the resistor board assembly located on the upper part of the rear deck of the unit. The point A+ is at the top of a 1 K, 2 watt resistor and the point B- is at the bottom of the same resistor. This 1 K, 2 watt resistor is adjacent to the 50 ohm, 5 watt resistor in the approximate center of the resistor board.

Set the "Over-Voltage Adjust" control to the maximum counter-clockwise position and set the "Over-Current Adjust" control to the maximum counter-clockwise position. Turn on the power supply and rotate the front panel voltage control one turn clockwise from its minimum position. If current in excess of 1 ampere flows through the ammeter, the overload protection circuitry is not functioning properly and must be repaired before proceeding further. If the current is less than 1 ampere, slowly rotate the "Over-Current Adjust" control clockwise until the ammeter reads 12 amperes (120% rated value). Lock the "Over-Current Adjust" control at

this setting. This completes the adjustment for the "Over-Current Adjust" control.

Rotate the "Over-Voltage Adjust" control clockwise until the current through the ammeter is reduced to minimum. Gradually turn the output voltage control clockwise until the voltmeter across terminals A+ and B- indicates 15 to 17 volts. This point is sharply determined. Rotate the "Over-Voltage Adjust" control counter-clockwise until current is increased to 10 amperes (rated current). This will cause the voltage (A+ to B-) to drop. Next, increase the setting of the front panel voltage control (clockwise) until the voltage (A+ to B-) is increased to 16 volts. Continue alternately rotating in small increments the "Over-Voltage Adjust" control counter-clockwise and the output voltage control clockwise until the ammeter indicates 10 amperes and the voltage across A+ and B- equals 17 volts. The adjustment of the "Over-Voltage Adjust" control is now complete. Any further rotation of the output voltage control will cause the output current to fall off to a safe current that is within the power handling capabilities of the pass transistors.

NOTE: All the above measurements are made with the input line voltage at approximately 115 volts AC.

OVER-TEMPERATURE PROTECTION: In the event of fan failure or accidental blocking of air vents, a temperature measuring device mounted on one of the series pass transistor elements will automatically turn the power supply off when the temperature is excessive. Check to see whether the

air vents are blocked or the fan is rotating. The fan should be operating even though the power supply has been turned off by the over-temperature protection device. To turn the power supply on again, once an over-temperature condition has occurred, remove the external load from the power supply and wait approximately 3 to 5 minutes for the unit to cool off. After this interval turn the power switch OFF and then ON again. If the power goes off the unit has not cooled to a safe operating temperature. If the fan is operating properly and the air vents are clear, there may be other internal failure and the internal difficulty should be removed in accordance with the Maintenance and Repair instructions.

If the supply is operating properly, reapply the load and let the unit operate for 10 to 15 minutes. Continued safe operation of the power supply may then be expected. If the supply shuts down with a load not exceeding the rated value of the supply, a possible internal failure should then be removed in accordance with the Maintenance and Repair instructions.

MAINTENANCE: The components of the Model SC-32-10 Semi-Conductor Regulated Power Supply have been selected and tested to provide long and trouble free operating life. Replacement of transistors may be necessary on rare occasions. The transistors in the regulated reference supply and in the reference amplifier are easily accessible by removing the rear cover plate. This cover plate is fastened with six screws. The transistors and components used for driving the series pass transistors are located on the bottom of the dissipator chassis and are easily accessible by removing the bottom cover plate.

Maintenance should be done only by qualified personnel who know transistor regulator circuitry. Serious and costly damage can result from inexperienced probing in the unit.

REPAIRS: Should any trouble develop in the instrument, it may be serviced with the aid of the schematic diagram. Major repairs, however, are usually handled by the factory.

Under no circumstances should the instrument be returned to the factory without proper authorization and shipping instructions. In any correspondence with the factory concerning repairs, the type and serial number of the instrument must be given together with a description of the trouble encountered.

PARTS LIST

DRAWING S-TRAM-8-01

C1	- 25	MF	25 WV
C2	- 2	MF	200 WV
C3	- 0.4	MF	50 WV
C4	- 0.1	MF	500 WV

Q1	- Transistor 2N441
Q2 thru Q6	- Transistor 2N382 (Alternate 2N383)
Q7	- Transistor 2N35 (Alternate GT-1092)
Q8	- Transistor 2N382 (Alternate 2N383)
Q9	- Transistor GT-1092
Q10	- Transistor GT-1092
Q11	- Transistor 2N382 (Alternate 2N383)
Q12	- Transistor 2N382 (Alternate 2N383)

R1	- 3.3	K	1/2 watt
R2	- 2.2	K	1/2 watt
R3	- 500	Ohm	3 watt WW
R4	- 500	Ohm	3 watt WW
R5	- 4.7	K	1/2 watt
R6	- 2.5	K	3 watt WW
R7	- 2.5	K	3 watt WW
R8	- 10	K	3 watt WW
R9	- 1.8	K	1/2 watt
R10	- 2.5	K	3 watt WW
R11	- 500	Ohm	3 watt WW
R12	- 1.85	K	1/2 watt WW
R13	- 100	Ohm	3 watt WW
R14	- 50	Ohm	3 watt WW
R15	- 4.7	K	1/2 watt
R16	- 220	Ohm	1/2 watt
R17	- 10	Ohm	1/2 watt
R18	- 1	K	1/2 watt
R19	- 1.6	K	1/2 watt
R20	- 2.7	K	1/2 watt
R21	- 300	Ohm	1/2 watt
R22	- 4.7	K	1/2 watt
R23	- 47	Ohm	1/2 watt
R24	- 4.7	Ohm	1/2 watt WW
R25	- 300	Ohm	2 watt Pot.

RD1 - Diode 1N429

PARTS LIST - MODEL SC-32-10

DRAWING S-SC-32-10-02

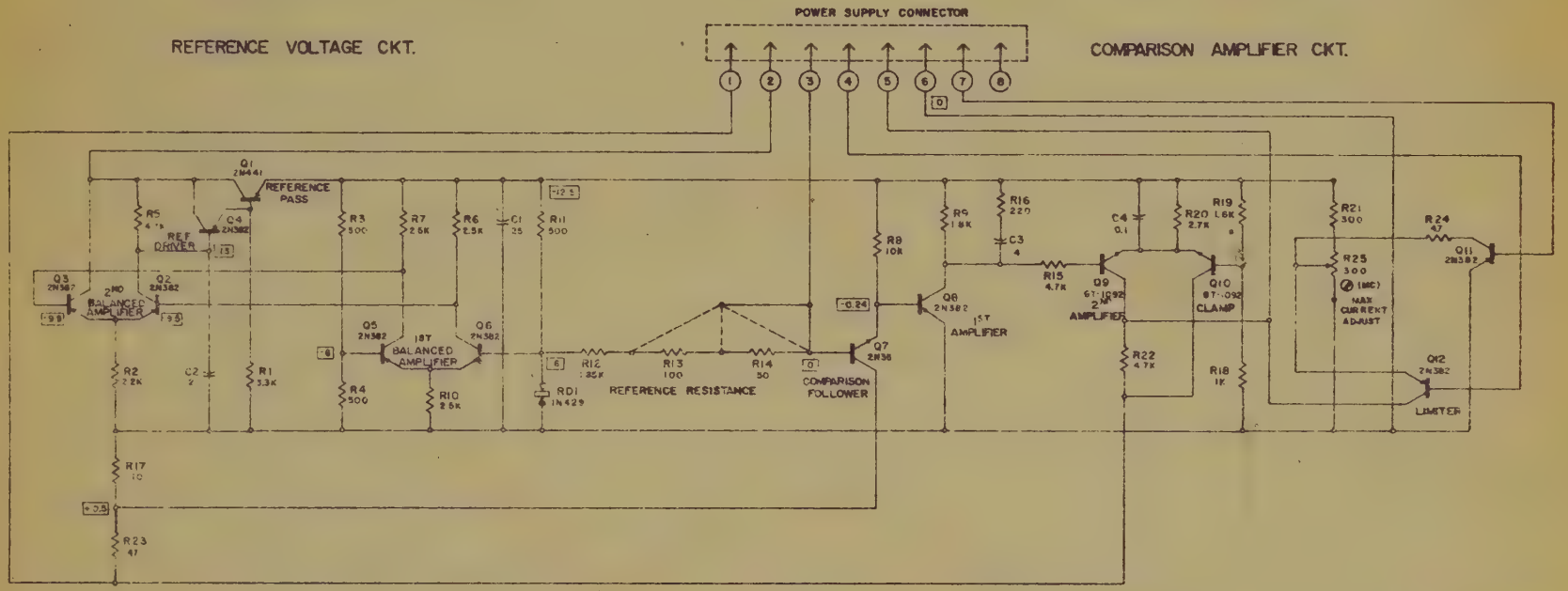
B201	- Fan		
C101	- 1	MF	200 WV
C201 thru C204	- 2400	MF	65 WV
C205	- 4000	MF	50 WV
C206	- 4000	MF	50 WV
C207	- 0.1	MF	500 WV
C301	- 500	MF	12 WV
C302	- 500	MF	12 WV
C303	- 350	MF	50 WV
C304	- 100	MF	150 WV
C305	- 0.4	MF	200 WV
C306	- 0.4	MF	200 WV
C401	- 10	MF	150 WV
C402	- 0.22	MF	200 WV
CR201	- Silicon Rectifier 3S1510B1S1		
CR301 thru CR306	- Germanium Rectifier 1N91		
CR307 thru CR310	- Silicon Rectifier PT-5		
CR401 and CR402	- Silicon Rectifier PT-5		
F101	- 15 Amp. Fuse		
F201	- 1/4 Amp. Fuse		
F202	- 3/4 Amp. Fuse		
M101	- Meter, 0-10 A DC		
M102	- Meter, 0-50 V DC		
PL101	- Neon Pilot Light NE-51		
Q301	- Transistor 2N382 (Alternate 2N383)		
Q901 thru Q921	- Transistor 2N441-6		
R101	- 10	K	10 turn Pot.
R201	- 0.05	Ohm	10 watt
R202	- 250	Ohm	40 watt WW
R203	- 100	Ohm	40 watt WW
R204	- 1000	Ohm	20 watt WW
R205	- 10	Ohm	20 watt WW

PARTS LIST - MODEL SC-32-10

DRAWING S-SC-32-10-02

R301	- 30	Ohm	3 watt WW
R302	- 470	Ohm	1/2 watt
R303	- 2	K	2 watt
R304	- 3.3	K	1/2 watt
R305	- 47	Ohm	1/2 watt
R306	- 430	Ohm	1/2 watt
R401	- 82	K	1/2 watt
R901 thru R920	- 1.5	Ohm	3 watt WW

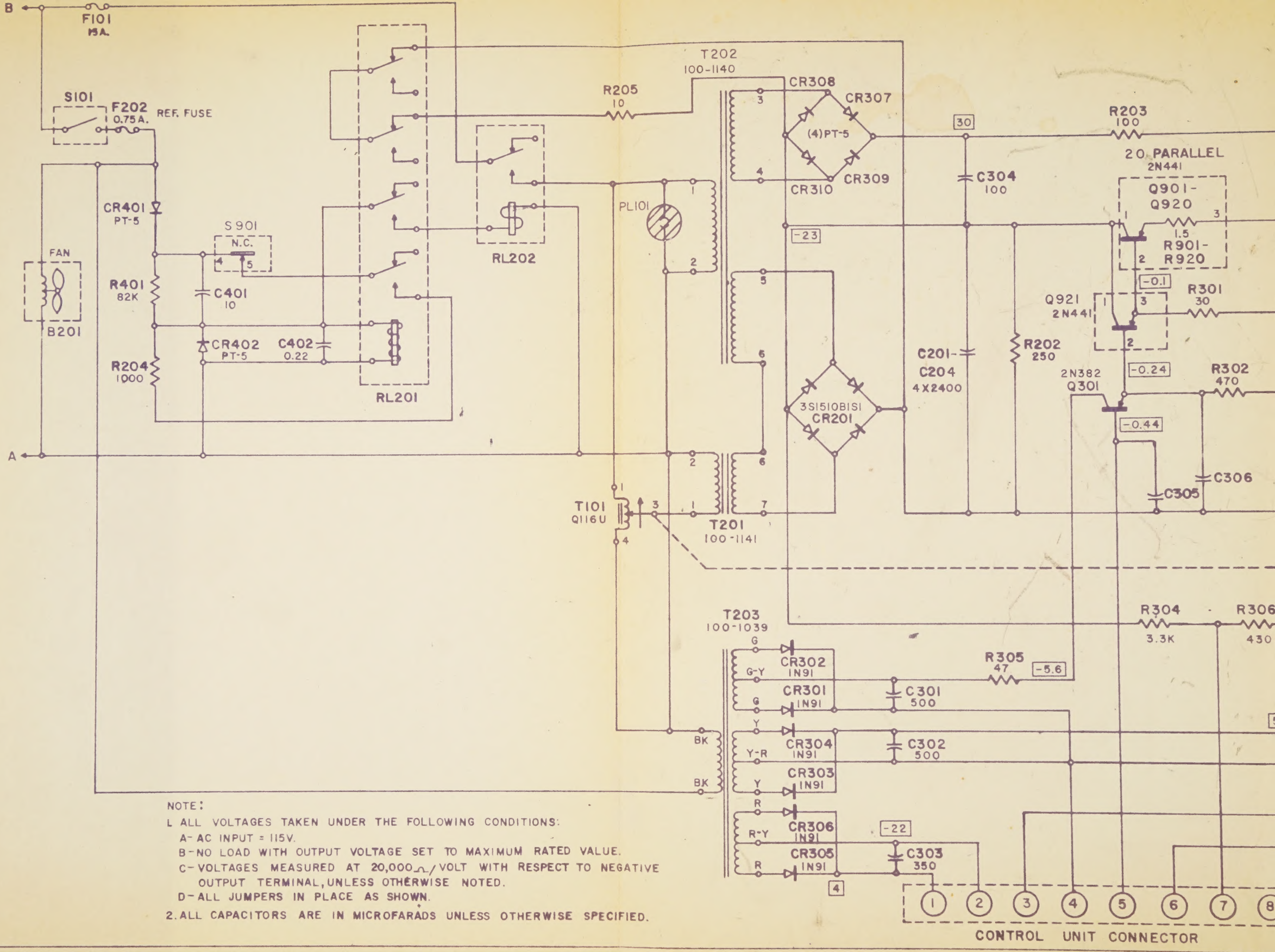
RL201	- 4PDT Relay
RL202	- SPDT Relay
S101	- SPST Switch
S901	- Thermoswitch N. C.
T101	- Powerstat Type Q116U
T201	- Kepco #100-1141
T202	- Kepco #100-1140
T203	- Kepco #100-1039
TB201	- Jones #8-142-Y



NOTE
1. ALL VOLTAGES TAKEN UNDER CONDITIONS SPECIFIED ON MAIN SCHEMATIC.
2. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
3. REFERENCE RESISTANCE MAYBE R12 IN COMBINATION WITH EITHER OR BOTH OF R13, R14.

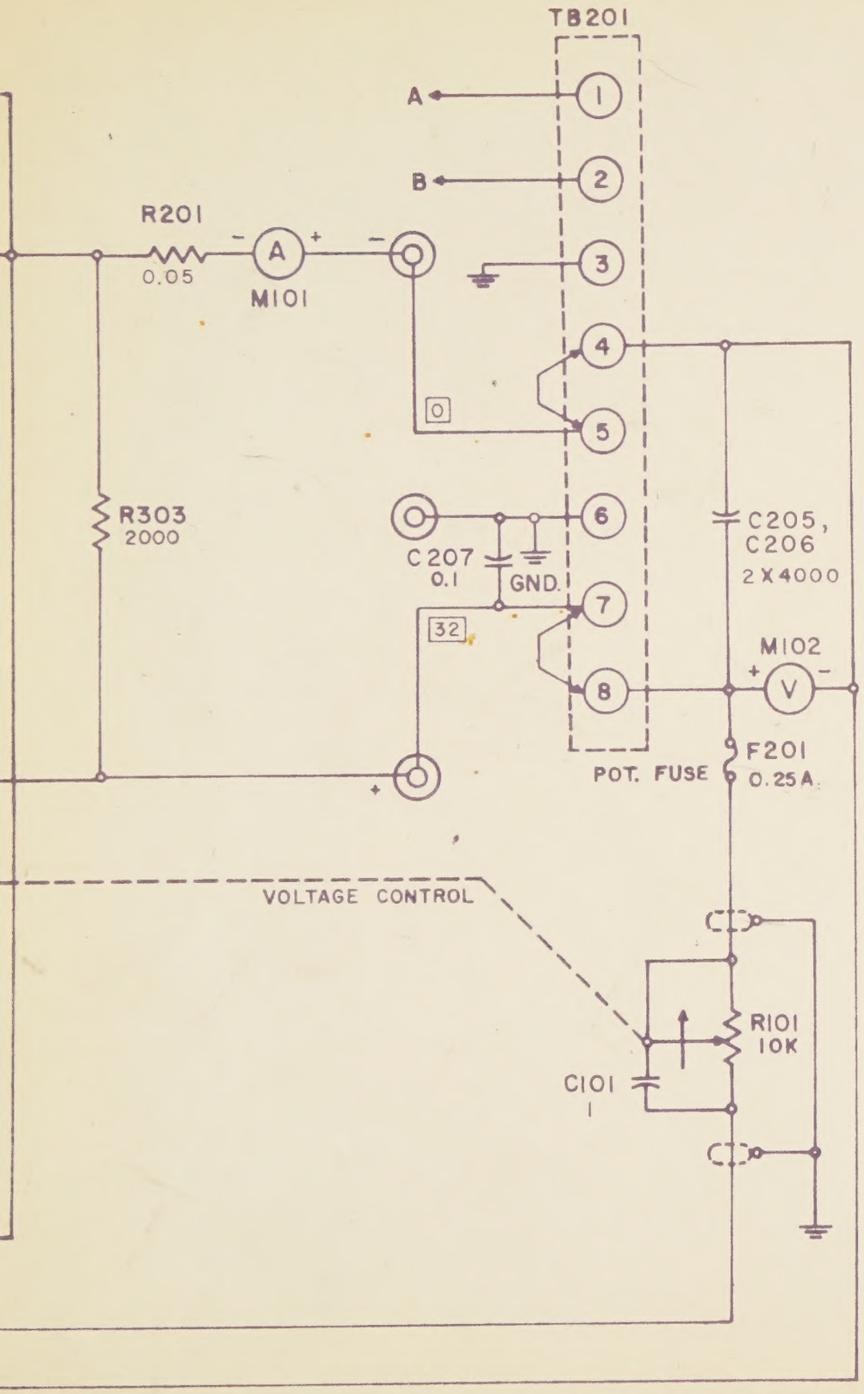
KEPCO LABORATORIES
FLUSHING NEW YORK

ITEM: REFERENCE AMPLIFIER	DCS
	APPD 4-20-89
MODEL: TRA18	DRTR AL
DWG. No. S-TRA18-01	CHKD



NOTE:

1. ALL VOLTAGES TAKEN UNDER THE FOLLOWING CONDITIONS:
   - A- AC INPUT = 115V.
   - B- NO LOAD WITH OUTPUT VOLTAGE SET TO MAXIMUM RATED VALUE.
   - C- VOLTAGES MEASURED AT 20,000Ω/VOLT WITH RESPECT TO NEGATIVE OUTPUT TERMINAL, UNLESS OTHERWISE NOTED.
   - D- ALL JUMPERS IN PLACE AS SHOWN.
2. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.



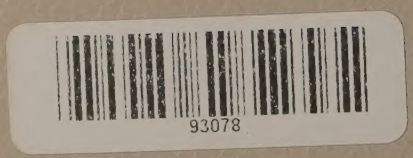
REAR TERMINAL STRIP

8	+ REMOTE ERROR SIGNAL
7	+ OUTPUT
6	GROUND
5	− OUTPUT
4	− REMOTE ERROR SIGNAL
3	GND.
2	HOT
1	NEUTRAL

A.C. INPUT
105-125 VOLTS,
50-65 CYCLES

KEPCO LABORATORIES
FLUSHING NEW YORK

ITEM: POWER UNIT	DES
	APPD 4-10-59
MODEL SC-32-10	DFTM A.L.
DWG. No. S-SC-32-10-02	CHKD E.V.



kepco inc.®

131-38 SANFORD AVENUE • FLUSHING 52, N. Y. • Area Code 212 IN 1-7000 • TWX # NY 4-5196

146-0045 - 1/62 -12M